M/035/015

25 May 96

MEMO FOR: Bob Mairley, Larry Kimmel, Eva Hoffman, Steve McNeal, Wayne Hedberg, John Whitehead, Walt Plumb, Terry Thatcher

FROM: Michael A. Schwinn, Utah Regulatory Office

SUBJECT: Record of Decision for Permit Application #199450301

Please find enclosed, a copy of the Kennecott Utah Copper Tailings Modernization Project, Record of Decision for Permit Number 199450301. If you have any questions, please contact me at (801) 295-8380.

Michael A. Schwinn
Chief, Utah Regulatory Office

RECORD OF DECISION
PERMIT APPLICATION NUMBER 199450301
KENNECOTT UTAH COPPER
TAILINGS MODERNIZATION Project

1. FINDINGS AND DECISION

The Department of the Army Permit Application Number 199450301 submitted by Kennecott Utah Copper Corporation for the Tailings Modernization Project has been reviewed and evaluated in accordance with regulations published in 33 CFR 320 through 330 and 40 CFR 230. All available information relevant to the application has been considered, including the Operating Plan Summary Report, Rev. G2, Morrison-Knudsen, 1994; Alternatives Analysis for the Tailings Modernization Project, SWCA, 1994; Seismic Hazard Evaluation, Kennecott Tailings Impoundment Modernization Project, Woodward-Clyde, 1994; North Impoundment Reclamation Plan, Rev. D. Morrison-Knudsen, 1994; Wetlands Mitigation Plan For The Tailings Modernization Project, SWCA, 1995; State of Utah and local permits and conditions and requirements; the Draft Environmental Impact Statement (DEIS) April, 1995; comments received at the DEIS public hearing held May 31, 1995; and the Final Environmental Impact Statement (including response to comments on the DEIS), December 1995; comments received at the public hearing held on January 18, 1996; and written comments received during the 41 day no action period following publication of the FEIS Notice of Availability in the Federal Register.

An evaluation of the probable impacts including cumulative impacts of Kennecott's Tailings Modernization Project on the public interest was completed. The private and public need for the work (33 CFR 320.4(2)(a) i-iii) is the continued operation of the Bingham Canyon Mine and production of a high grade of pure copper. Kennecott Utah Copper contributes significantly to the state and local economy while providing copper metal for domestic and international industries. The Project will provide dynamic stability for the existing impoundment in the event of a seismic event. An extensive analysis of potential alternatives resulted in the selection of the North Expansion West Alternative as the least damaging practicable alternative (see chapters 1 and 2 of the FEIS for a complete evaluation of the purpose and need of the Project and alternatives analysis).

The area proposed for the expansion of the tailings impoundment has had a long history of industrial uses ranging from the mining of oolitic sands to salt extraction and phosogypsum production. The area selected for the expansion is best suited for continued industrial use. Ultimate reclamation of the tailings impoundment will result in a long-term improvement in aesthetics of the area and upland habitat for a variety of terrestrial wildlife species. The loss of approximately 1,055 acres of low value jurisdictional waters will be mitigated through the creation, enhancement and protection of 2,500 acres of high value wetlands, playas and upland habitats. The

mitigation area will be designed to provide for public use with emphasis on environmental education. This will make a substantial contribution to the quality of life for the surrounding communities.

This Project has been evaluated in accordance with the Section 404(b)(1) Guidelines in which consideration was given to cost, existing technology and logistics in light of the overall Project purpose. A total of twelve alternatives have been evaluated. Chapter 2 of the FEIS contains a complete description and analyses of the alternatives as per the Section 404(b)(1) Guidelines. Given the overall Project purpose, it has been determined that the North Expansion West Alternative is the least damaging, practicable alternative.

Based on the foregoing evaluations, a determination of compliance the Section 404(b)(1) Guidelines and public interest review, it is the finding of the U.S. Army Corps of Engineers that the issuance of a Department of the Army Permit for the Permittee's preferred alternative (the North Expansion West Alternative) as described in the Final Environmental Impact Statement (FEIS), would not be contrary to the public interest. Therefore, the request for a Department of the Army permit is granted, subject to the committed mitigation measures described in the FEIS and summarized in Section 9 and to the conditions as described in Section 10.

2. PROPOSED PROJECT

The Proposed Project would transition existing tailings storage operations to a new impoundment north of the Permittee's existing impoundment facility. This is the North Expansion West Alternative and is the Permittee's Proposed Project. The final storage capacity of the new impoundment would be between 1.5 and 1.6 billion tons of tailings, with 300 to 400 million additional tons stored in the existing impoundment. The Proposed Action includes the following major activities:

- Constructing the wetland mitigation
- Relocating utilities, ditches, and railroad lines
- Constructing a visual buffer along Interstate 80
- Preparing the foundation and putting the new impoundment drainage blanket in place
- Constructing the starter dike, header dikes, toe ditch, and toe dike
- Constructing cyclone stations near the new impoundment
- Modifying the tailings distribution system
- Transitioning from the existing impoundment to the new impoundment
- Revegetating the existing impoundment
- Constructing the new impoundment embankment as it is filled with tailings
- Vegetating the new impoundment area after it is filled to capacity.

During the initial construction phases of the Proposed Project, Kennecott would place 300 to 400 million tons of tailings into the existing impoundment, bringing its final height to approximately 250 feet. The expansion would begin receiving tailings in late 1998, and the forecasted 1.5 to 1.6 billion tons of future tailings would be placed into the impoundment immediately adjacent to the existing impoundment. A starter dike would be constructed of underflow sands for early containment of tailings overflow in the event of a seismically induced (i.e., earthquake) failure of the existing impoundment.

The design is for the construction of an approximate 250-foot high embankment, approximately 7.0 miles long, to store approximately 1.5 to 1.6 billion tons of tailings produced during the next 25 to 30 years of operation.

The total impacted area, including the toe ditch, utility, railroad and road relocations etc. would be approximately 4,325 acres. The impoundment/embankment footprint would be approximately 3,294 acres. A total of 1,055 acres of Jurisdictional Wetlands and Other Waters of the U.S. would be filled, including 391 acres of saline playa, 226 acres of emergent wetlands, 63 acres of open water, 81 acres of overflow basins, and 294 acres of salt evaporation pond dikes currently used by a gull colony. A more detailed description of the Proposed Project and its impacts can be found in chapters 2 and 3 of the FEIS.

3. PURPOSE AND NEED FOR THE PROPOSED PROJECT

The Tailings Modernization Project has been proposed by the Permittee to transition existing tailings storage operations to a new impoundment area for two purposes:

1) **Increase the dynamic stability of the existing impoundment to enhance its integrity during a significant earthquake.**

   Although the existing impoundment is stable under static (non-earthquake) conditions, it must be upgraded to improve its dynamic (seismic) stability. Until very recently, the design of facilities in the Salt Lake Valley had not considered the effects of a large earthquake. As technology has advanced, more recent studies of the seismic nature of the Salt Lake Valley have indicated the increased possibility of a significant earthquake. Since the likelihood of such an earthquake appears to be greater than previously thought, many structures in the valley are being upgraded and the design of new facilities takes seismicity into consideration. The permittee has evaluated the dynamic stability of the existing impoundment and determined a need for a seismic upgrade.

2) **To provide storage for the 1.9 billion tons of tailings generated from the proven reserves at the Bingham Canyon Mine over the next 25-30 years.**

Bingham Canyon Mine contains proven and probable ore reserves to support current production for 25-30 years. Of the 1.9 billion tons of tailings generated during this time period, the existing impoundment can accommodate 15 to 20 percent (300 to 400 million tons). The proposed new impoundment would provide the additional storage necessary for the remainder of the tailings.

A more detailed discussion on the purpose and need for the Proposed Project is found in the Final Environmental Impact Statement, Chapter 2 - Description of the Proposed Action and Alternatives.

4. ALTERNATIVES

A detailed analysis of alternatives is presented in Chapter 2 of the FEIS. Alternatives were formulated to meet the purpose and need for the Project and to reduce potential impact to jurisdictional wetlands and other waters of the U.S. In 1994, a practicability analysis was prepared as required by the Section 404(b)(1) Guidelines. In addition, a workshop was held in October, 1994 to re-evaluate all alternatives previously studied. Lands within a 20 mile radius of the Copperton Concentrator were again examined for potential tailings impoundment sites.

A total of twelve alternatives were identified and evaluated. They consisted of five on-site alternatives located on or adjacent to the existing tailings impoundment and five off-site alternatives located some distance from the existing tailings impoundment, one combined on-site and off-site alternative and the No Federal Action alternative.

The alternatives evaluated were:

- Initial Plan - Full Expansion of the Existing Tailings Impoundment
- Expand Existing Tailings On-Site - North Expansion Alternatives
  - Continue Raising the Existing Impoundment, Construct a Berm
  - North Expansion West
  - North Expansion East
  - Reduced North Expansion
- Off-Site Alternatives
  - Barneys Canyon
  - Coon Canyon
  - Dry Fork/Carr Fork
  - Tooele/Carr Fork
  - Stockton
- Combined Alternative - Reduced North Expansion and Barneys Canyon

- No Federal Action - No Change from Current Operations

The Final Environmental Impact Statement, Section 2.3.2 Alternatives Screening presented three primary criteria for the evaluation of alternatives to determine which were reasonable, feasible and practical. The three primary criteria were, technical, logistical and economic. Maximum thresholds and operating norms for the logistical and technical criteria were investigated and established and used to help evaluate the feasibility of constructing and operating the various alternatives. Environmental and regulatory factors were also considered during the screening process. Chapter 2 of the FEIS contains a complete description of the alternative.

The **Initial Plan** was eliminated because it would impact the greatest area of Jurisdictional Wetlands and Other Waters of the U.S., over 2,100 acres, and would cover lands within the City of Salt Lake. The alternative **Continue Raising Existing Tailings Impoundment, Construct Berm** was considered infeasible, as it would not meet the Project need for storage of 1.9 billion tons without imposing a rate of rise of 4 to 5 feet more per year than the existing dam could sustain without compromising the stability of the embankment. The **Reduced North Expansion** alternative was eliminated because it did not meet the Project purpose, and would be statically and dynamically unstable.

Of the off-site alternatives, **Barneys Canyon** was considered infeasible because it did not meet technical and environmental criteria. Problems included the potential for rupture of the geomembrane over time potentially placing the municipal water supply of the City of West Valley in jeopardy. The **Coon Canyon** alternative was eliminated from further consideration because it would require an embankment 1,200 feet high to store 1.6 billion tons of tailings. In addition, the tailings would have to be pumped uphill from both the Copperton and North concentrators with a lift of 1,000 feet and over 1,200 feet, respectively and the pipelines could potentially affect additional wetlands. Also, the potential for rupture of the geomembrane liner presented an unacceptable risk to the West Valley municipal water supply. **The Dry Fork/Carr Fork** alternative was eliminated because of differential settlement problems inherent in the alluvial and volcanic deposits in the area and because it would require installation of a liner and drainage system to protect the aquifer, and would require the initial pumping of the tailings slurry 1,000 feet in elevation over a 20 mile distance. The **Tooele/Carr Fork** alternative was eliminated primarily due to logistical constraints, including the site's location over an aquifer recharge area, the installation of a liner, and the requirement of pumping the tailings slurry uphill 280 feet over a 5.7 mile distance. **The Stockton** alternative was eliminated because it would require the installation of tailings pipelines over 21 miles long, with a pumping head of approximately 650 feet in elevation, and lining of approximately 4,400 acres.

The combination alternative, **Reduced North Expansion and Barneys Canyon**, was eliminated because of the need for a double geomembrane

and clay liner at Barneys Canyon and the potential risk of contamination of ground water supplies and insufficient cycloned tailings material for construction.

The **North Expansion West** alternative, which is the preferred alternative, would accommodate the full Projected tailings volume of 1.9 billion tons, by expanding into the area immediately to the north and northwest of the existing impoundment. The impoundment/embankment footprint would be approximately 3,294 acres, with a total impacted area approximately 4,325 acres. This alternative would affect 1,055 acres of Jurisdictional Wetlands or Other Waters of the U.S. Approximately 226 acres of the 1,055 acres under Corps jurisdiction that would be directly affected are emergent wetlands. The existing impoundment would receive 300 to 400 million tons of tailings, bringing its final height to approximately 250 feet. The new impoundment would include an embankment, approximately 245 feet high and 7.0 miles long, that would store approximately 1.5 to 1.6 billion tons of tailings produced during the next 25-30 years of mining operation. Dewatering would continue along the east side, southeast corner, and southwest reach of the existing impoundment to address seismic upgrade needs of the embankment. Over 60 percent of the land to be used under this alternative has been previously disturbed by industrial activities.

Geology in the area north of the existing impoundment is suitable for embankment construction and tailings storage. Due to the presence of a continuous layer of low-permeability Bonneville Clay underlying the expansion area, no synthetic liner would be included in the design. This alternative is the Permittee's proposed Project and preferred alternative.

5. SUMMARY OF IMPACTS AND FACTORS CONSIDERED

JURISDICTIONAL WETLANDS AND OTHER WATERS OF THE UNITED STATES

Direct impact by filling will occur to approximately 1,055 acres under federal jurisdiction including 391 acres of saline playas, 226 acres of emergent wetlands, 294 acres of former salt evaporator pond dikes, 63 acres of open water, and 81 acres of overflow basins. Jurisdictional waters that are not directly filled by the tailings expansion may be disturbed by construction activities related to relocating the railroad and other utilities, constructing roads, or by rerouting the C-7 Ditch and installing the outfall to Lee Creek.

VEGETATION

The Project will cover with tailings or disturb by excavation approximately 3,270 acres of upland/made-land including grassland, alkali-scrub-shrub, scrub and made-land (usually devoid of vegetation). An estimated 226 acres of the total area affected contains emergent wetland or riparian scrub/shrub vegetation that occurs in narrow borders along the C-7 Ditch.

There will be no soil contamination by metals, metalloids or organics above the plant toxicity levels; therefore, no secondary effects would occur through bioaccumulation in plant tissues and or ingestion by wildlife.

WILDLIFE

Direct impacts to terrestrial wildlife will result from expanding the existing tailings impoundment (e.g., loss of vegetation and acreage). There would be displacement of shorebirds and waterfowl which currently use the wetlands; and, mule deer which are found in upland habitats. Direct impacts will be loss of up to 226 acres wetlands, 391 acres saline playas and 294 acres of salt impoundments and over 3,000 acres of highly degraded, low habitat value upland grasslands and scrub. Implementation of the mitigation plan will enhance habitat value, especially for shorebirds and waterfowl.

No impacts to shorebirds, waterfowl, or other terrestrial biota from metal or metalloid (including selenium) accumulations are expected. The exception would be for birds feeding in the West C-7 Ditch. Selenium concentrations in the West C-7 Ditch were Projected to be above the level that has been shown to affect avian reproduction in other areas. To mitigate this impact the West C-7 Ditch water will be piped from its point of origin to where it is diluted by the Tooele water at the I-80 culvert in a manner that minimizes exposure to wildlife. Birds that depend on Great Salt Lake brine shrimp for food will not be affected as there will be no impact to the brine shrimp nor will they accumulate additional loads of toxic substances.

AQUATIC BIOTA

The open water aquatic habitats that will be lost include: approximately four(4) miles of the existing C-7 Ditch, two (2) miles of the West C-7 Ditch, and approximately 63 acres of other ponded water that occurs west of the existing impoundment along I-80 and the small, narrow ponds associated with emergent wetlands that have formed parallel to the railroad tracks adjacent to C-7 Ditch. Filling and relocating of two miles of the West C-7 Ditch, a relatively good aquatic habitat, would result in the loss of this aquatic habitat and fish species and is considered a high impact.

The estimated toxicity threshold for brine shrimp is 0.200 mg/L of selenium. This concentration is not estimated to be exceeded, post-expansion, unless current operational practices (i.e. continuous discharge through UPDES Outfall 004) are suspended during a period of "worst case" high selenium discharge through UPDES Outfall 008. The permit conditions include mitigation consisting of the requirement to pipe the West C-7 Ditch from the point of origin to where it is diluted by the Tooele water. Also, sampling and monitoring will be required during brine shrimp hatching periods in order to detect

whether or not selenium concentrations are exceeding the estimated toxicity level for brine shrimp.

SPECIAL STATUS SPECIES/THREATENED AND ENDANGERED SPECIES

The Project including the implementation of the mitigation site will result in a net benefit to special status species. No habitat within the area impacted by the Project has been identified for any threatened or endangered species. The area provides limited prey resources for bald eagle and peregrine falcon and the Project will not affect either of these species. There will be no direct loss of special status species resulting from the construction of the Project.

Snowy plovers were observed at the salt evaporation impoundments which is an area possibly used for nesting during the previous year. Potential adverse effects of the tailings expansion on snowy plovers would be minimal, but may include loss of potential nesting habitat or actual nest sites and loss of foraging habitat. Impacts of the proposed expansion would be insignificant due to the low utilization of the area and because of the low quality of the habitat. Additional factors reducing the potential impacts include: the existence of other nesting habitat along the shores of Great Salt Lake, the wide dispersion of snowy plovers around this lake, and the dependence of the species on relatively unstable habitats and its subsequent ability to utilize newly created habitats (SWCA, 1993).

SURFACE WATER SUPPLY

Surface water impacts include the rerouting of the C-7 Ditch north to merge with the Brighton Drain/lower Lee Creek system and discharge to Great Salt Lake via the historic Lee Creek drainage. Although the West C-7 Ditch would be rerouted around the new impoundment, there will be no change to the point of discharge.

Upon rerouting of the C-7 Ditch, the summer Projected average discharge via the West C-7 Ditch to Lake Discharge #1 would be low; an estimated average of 4.5 cfs. Flows via the relocated C-7 Ditch into lower Lee Creek and Great Salt Lake during the dry season are expected to be between 36 cfs and 48 cfs, up from current dry season flows (less than 5.5 cfs).

SURFACE WATER QUALITY

The predicted effects at the West C-7 Ditch outlet to Great Salt Lake would be as follows:

- Average selenium concentrations would significantly increase during winter months
- While average concentrations for selenium increases as a result of the change, total loads into the Lake at this location are estimated to decrease slightly due to lower flows

- Average concentrations of other metals (aluminum, arsenic, copper, iron, silver, zinc) are expected to decrease as a result of the Smelter modernization and construction of a hydrometallurgical plant

The predicted effects at the lower Lee Creek outlet to Great Salt Lake would be as follows:

- The predicted winter and summer seasonal average selenium concentration is expected to range from 0.005 to 0.007 mg/L as compared to baseline concentrations of approximately 0.009 mg/L.
- Average winter concentrations of nitrate are expected to increase from less than 1 mg/L to between 2.1 and 2.4 mg/L.
- Average chloride and total dissolved solids concentrations would greatly decrease, dropping from over 80,000 and 135,000 mg/L to below 850 and 3,000 mg/L
- Average aluminum, arsenic, copper, iron, lead, silver, and zinc concentrations would decrease.

Total loads of heavy metals entering Great Salt Lake will remain approximately the same or decrease after the impoundment expansion. As total loads into the Lake will not increase, aggregate amounts precipitated into sediments will not increase.

Impacts to surface water ditches and canals may be caused by sedimentation during storms. Impacts of stormwater runoff quality will be mitigated through similar seeding and active erosion control measures that are used for the existing impoundment. A toe ditch constructed around the perimeter of the embankment will collect storm water runoff. The sediment from runoff is precipitated into the Clarification Canal or Sediment Pond and periodically removed.

GROUND WATER SUPPLY

A reversal in vertical hydraulic gradients will occur under the footprint of the expanded tailings impoundment. This reversal in vertical hydraulic gradients from upward to downward does not and would not: 1) extend a significant distance beyond the footprint of the existing or proposed expanded tailings impoundment; or 2) result in the movement of a large quantity of tailings water into the Shallow Aquifer. The additional seepage from the expanded tailings impoundment has been estimated to be 206 gpm.

Horizontal hydraulic gradients in the Shallow Aquifer, and to a limited degree in the Principal Aquifer, would be changed as follows under the footprint of the expanded tailings impoundment:

- Steepened in the north direction on the north side
- Changed from generally northward to eastward under the east side

- Changed from generally northward to west to southwestward under the west side
- Changed from generally northward to southward under the south side.

These changes would not extend beyond the footprint of the proposed impoundment as indicated by pore pressure dissipation tests and water level elevations measured in nested wells adjacent to the existing impoundment (see section 3.3.3 of the FEIS).

The quantity of water discharged to springs and seeps in nearby wetland areas and water levels and capacities of nearby ground water production wells are not expected to be affected by the Project.

GROUND WATER QUALITY

Water used to slurry tailings and leachate generated by the tailings have a potential to impact ground water quality. Water quality data and studies indicate there will be no detrimental effect on ground water quality in the area. The lack of impacts is due to the:

- Relatively good quality of water used to slurry tailings compared to the poor quality of water in the Shallow Aquifer in the area of the existing tailings impoundment which is a discharge area for the Shallow Aquifer
- Chemical properties of the tailings and tailings water which preclude the development of acidic conditions and the leaching of metals in the interior of the impoundment
- The relatively large neutralization potential of the soils and underlying Shallow Aquifer which would neutralize any acidic water potentially generated by the tailings
- The small vertical hydraulic conductivities and poor drainage characteristics of the tailings which limit the vertical movement of water within the tailings
- Small vertical and relatively larger horizontal hydraulic conductivity of the underlying Bonneville Clay which promotes horizontal flow of water outward to the drainage system.

Ground water quality could be impacted as existing interstitial pore water is flushed out and solids are leached by the water used to slurry tailings that will cover phosphogypsum stack materials. The phosphogypsum stack materials contain acidic pore water, radionuclides, and leachable metals at the former Chevron Phosphate Plant. Ground water quality and geochemical studies indicate that the phosphogypsum stack materials will not significantly impact ground water quality. The lack of significant impacts is due to the presence of a physical barrier and the neutralizing potential of the Bonneville Clay layer. A physical barrier is created by the relatively small vertical and larger horizontal hydraulic conductivities of the underlying Bonneville Clay. Some water could enter the underlying Bonneville Clay. However, the Bonneville Clay contains a large amount

of calcium carbonate ($CaCO_3$) and a large neutralization potential which would largely buffer acidic water from the phosphogypsum stack. Over time, alkaline tailings water will displace acidic phosphogypsum stack water.

Slag from smelter operations will be used in the construction of the drainage blanket. Testing indicates that this material does not contain RCRA metals that are generally mobile under Synthetic Precipitation Leaching Procedure (SPLP). The slag is not likely to generate leachate that would adversely impact ground water quality.

Existing salt evaporation ponds will be covered by tailings. Because the dominant mineral in the salt evaporation ponds is sodium chloride, which is very soluble, water that contacts this material is expected to increase in sodium, chloride, and TDS concentrations. This increase in concentrations is expected to be a transient condition and is not expected to significantly impact ground water quality.

Beneficial use of ground water in the area is not expected to be changed by the Project.

Mitigation that would be conducted by the Permittee would include monitoring and reporting as specified by the Utah Department of Environmental Quality, Division of Water Quality in the conditions to be met for the Ground Water Discharge Permit which was issued in December 1995 for the tailings impoundment.

EARTH RESOURCES

Significant areal settlement will occur within the footprint of the expanded impoundment, however, settlement of facilities located more than 100 feet from the toe of the impoundment will be minimal. Areal settlement is not expected to impact I-80 or railroads proximate to the impoundment footprint, nor will it compromise the integrity of the *in situ* clay liner.

LAND USE, TRANSPORTATION AND UTILITIES

The Project will require the relocation of existing electrical power lines, fiber optic cables, communication facilities, fuel lines, railroad tracks, and State Road 202. The Project will not displace or otherwise impact existing recreational or tourist facilities and uses or cause a loss of recreation and tourism opportunities on the south shore of Great Salt Lake or preclude future commercial development at the Saltair Resort.

The Union Pacific Railroad, Utah Power & Light Co., Mountain Fuel Supply Company, U.S. West, Sprint and MCI have agreed to the plans for the relocation of railroad, power lines, cables and fuel lines.

The Permittee has and will continue to coordinate with Utah Power & Light regarding the relocation of the power lines. The Utah Department of Transportation and the Permittee plan to close State Road 202 for approximately 2 years to allow for the replacement and upgrade of the SR 202 bridge, road pavement and construction of a new railroad crossing. The UDOT and Permittee will continue to coordinate with the Utah Department of Natural Resources, Division of Parks and Recreation and Saltair Resort regarding the closure of SR 202 which would affect secondary highway access to the Great Salt Lake Park and Saltair Resort.

VISUAL RESOURCES

Views from points west of the proposed Project and from travel routes will be changed. However, the development of the embankment would be gradual over a period of 25 years and the current view from the west would be enhanced by the removal of the existing fertilizer plant, phosphogypsum stack and the reduction in the slag pile to the south. From most locations in or near Saltair Resort or Saltair Beach State Park, the impact would be moderate and after the impoundment is at full height, it could be perceived as significant.

The Permittee proposes to construct a series of landscaped berms to serve as a visual buffer between Interstate 80 and the new tailings impoundment as a means to mitigate visual impacts.

SOCIOECONOMICS

No adverse impacts to social and economic resources would result from the Project. The Tailings Modernization Project would sustain current levels of direct and secondary mine-related employment and income in the regional economy. It would also generate over 10,000 worker-years of new employment and over $345 million in personal income for, primarily, residents of Salt Lake and Tooele counties (in 1994 dollars). In the peak year of construction activity, total direct employment on the Project would amount to almost 1,200 jobs, and the payroll spending plus indirect and induced output and employment stemming from procurement of construction supplies and services would generate an additional 1,700 jobs and over $56 million in regional personal income. Completion of the Project would end the jobs and income stimulus from construction, but the long-term support of regional employment and income from mining and refining activities would continue.

HAZARDOUS MATERIALS/WASTES

Construction of a fuel, oil and lubricant station will be required to support the mobile equipment that will be assigned to the tailings expansion. The design, construction, and operation of this station will be in accordance with federal, state and local regulations governing the storage of petroleum products.

Mitigation includes performing environmental investigations or actions, and demolition and "clean-up" (petroleum contaminated soils) of the former Chevron Phosphate Plant. Also, petroleum contaminated soils in the Union Pacific Railroad maintenance yard will be addressed following relocation of the tracks. If required, the soils will be removed in compliance with applicable state regulations.

CULTURAL RESOURCES

Three National Register of Historic Places (NRHP) eligible sites will be affected by the Project: the abandoned Salt Lake, Garfield, & West Railroad, the realigned Union Pacific/Los Angeles and Salt Lake Railroad, and the realigned Western Pacific Railroad.

Mitigation will be conducted through a data recovery process. A Data Recovery Treatment Plan was approved by the Utah State Historic Preservation Office (SHPO) on November 13, 1995.

A Memorandum of Agreement (MOA) regarding data recovery of the three historic railroad properties has been agreed to by the Permittee, Corps, SHPO, and the Advisory Council on Historic Preservation (ACHP).

Kennecott will conduct data recovery as described in the Data Recovery Treatment Plan prior to the start of construction and resulting impact to historic railroad properties.

NOISE

During construction, especially of the Highway 202 overpass, equipment noise may be audible at points west of the Project area. Predicted noise levels generated during construction would increase slightly from existing noise levels, but are not expected to exceed Salt Lake City-County Health Department noise regulations and would be of short duration.

AIR QUALITY

The Project would result in the long term decrease in fugitive emissions after the existing impoundment is closed and because the new impoundment would be smaller than the existing tailings impoundment. An air emission inventory was conducted to determine the total direct and indirect emissions that would result from the construction of the Tailings Modernization Project. The emission inventories calculated for PM_{10}, VOC, and NO_x, determined these totals are below the levels triggering a conformity determination under 40 CFR 51.853(b)(1). Particulate emissions would be mitigated by implementing dust control methods and practices described in the June 7, 1994 Tailings Modernization Project Fugitive Dust Abatement Program document and conditions set forth in the Approval Order from the Utah Division of Air Quality (UDAQ, July 1995) including compliance with R307-1-4.5 UAC which address fugitive emissions and fugitive dust abatement

requirements. The controlled PM_{10} emissions and resulting impacts to the ambient air quality would be insignificant, resulting in continued achievement of the NAAQS, in the vicinity of the Project.

6. CUMULATIVE IMPACTS

BIOLOGICAL RESOURCES

The future health, viability, or sustainability of the biological resources within the saline wetland Great Salt Lake ecosystem was evaluated by examining the aggregate of past, present or reasonably foreseeable future actions affecting these wetlands.

Presently, there are twenty known wetland fills within the vicinity of the southeastern shore of the Great Salt Lake that are associated with actions requiring Corps 404 permits. Four of the wetland fills, totalling less than 5 acres, were each less than 1 or 2 acres and did not require mitigation. Five permits involved substantial fill within saline playa, emergent marsh/meadow, riparian scrub/shrub or open water habitats. When these Projects are completely constructed, the total amount of wetlands affected will be approximately 450 acres; while approximately 510 acres of wetland mitigation area will be created or restored.

Considering the southeastern shoreline vicinity of Great Salt Lake, the estimated maximum amount of saline playa/wetlands that will be filled over a five year period (1993-1998) by a combination of unrelated Projects, including the Proposed Project, would be approximately 1,535 acres.

Mitigation for this combination of Projects would result in a minimum of 3,010 acres of enhanced, created, restored, and/or beneficially managed saline playa/wetlands in perpetuity. Providing mitigation goals are met for all of the different Projects, the net cumulative effect in the southeastern shoreline vicinity would be positive resulting in a minimum of an additional 1,475 acres of enhanced, created, restored, and/or beneficially managed saline playa/wetlands with the Proposed Project.

WATER QUALITY

The Project will continue current discharges to the Great Salt Lake, although the C-7 Ditch will be rerouted to the lower Lee Creek drainage. The waters of the south arm of Great Salt Lake may have additive impacts from multiple sources, including discharges of pollutants from oil refineries, and sewage treatment plants. To evaluate these potential effects, the current and past permits for discharges to the Lake and drainages that enter the southeast end of the lake were researched with the Utah Department of Environmental Quality, Division of Water Quality (Don Hilden, Personal Communication, April 10, 1995).

Four industries and three waste water treatment plants are currently permitted to discharge directly to the south arm of the Lake. The waste water treatment plants each treat the discharge with secondary water treatment prior to discharging. An additional sewage treatment plant and one industrial manufacturer are discharging to points upstream that eventually flow into the Lake.

The cumulative effects of the addition of tailings and UPDES water to Great Salt Lake will lower the total dissolved solids (TDS) concentrations near the discharge [points. The potential cumulative effects resulting from discharge of pollutants from all dischargers (agricultural and industrial sources) to Great Salt Lake is unknown at this time, but the Project is not predicted to significantly alter existing conditions.

Comments submitted on the Draft EIS expressed concern regarding the effects of selenium loading to the lake from Kennecott operations compared to loading from all surface water sources discharging to the Great Salt Lake.

A comparison of what is known about other sources of selenium to the lake with the predicted loading of selenium from the Garfield Wells and other Kennecott sources to the Lake was conducted.

It has been estimated that the entire Great Salt Lake receives 1.9 million acre-feet of water annually from surface water sources, with Bear (59%), Weber (20%) and Jordan (13%) Rivers contributing 92% of the total (Arnow, 1980). Tayler et.al. (1980) estimated that the average concentration of selenium in inflowing water is 0.002 ppm (mg/L). This estimate purposely excludes major industrial sources to "more nearly approximate pre-industrial conditions" (Tayler et.al., 1980). Waters flowing in from these sources today probably carry higher concentrations of selenium from agricultural and industrial sources. In fact, samples from the summer of 1995 taken of water discharging from Farmington Bay Waterfowl Management Area had a range of selenium concentrations from 0.008 to 0.015 ppm (mg/L). Based on Tayler's conservative estimate of 0.002 ppm (mg/L) selenium, surface water sources would contribute approximately 4,700 kg of selenium to the lake per year. Utilizing Farmington Bay WA measurements, the initial conservative selenium concentration of 0.002 ppm (mg/L) could range as high as 0.015 ppm (mg/L). Assuming all inputs to the lake were at this 0.015 ppm (mg/L) level, the resulting total surface water selenium loads to the lake would range from 4,700 kg to 35,000 kg. Recognizing that a calculation of selenium loading o the lake based on average surface water concentrations of selenium at 0.015 ppm (mg/L) may represent a worst case estimate, it does serve to illustrate the range in which the true value lies.

Using the conservative analysis of Projected loading to the lake contained in Appendix F of the FEIS, the combined loading of selenium from lake discharges #1 through #3 will be 971 kg per year. This represents a range of approximately 2.7 % to 20.7% of the total

loading (4,700 kg to 35,000 kg) from all surface water sources. These percentages are still on the high side because they assume that all water coming out of discharges #1 through #3 will be Kennecott water, when in fact some of the selenium originates off-site.

LAND USE AND VISUAL RESOURCES

Filling 1,055 acres of jurisdictional wetlands and waters of the U.S. with copper tailings and constructing an impoundment with 250 foot high side slopes will influence the Great Salt Lake environment by virtue of the Project's size and magnitude alone.

Development pressure is high within Salt Lake and Davis counties and the Salt Lake City metropolitan area is one of the fastest growing cities in the United States. Five or six Projects, including light industrial, commercial, and golf course are planned in the vicinity of the south shore of Great Salt Lake that will contribute to urbanization and changing character of the landscape. The preservation of approximately 2,500 acres by the permittee is an important contribution to off-set increasing urban sprawl. This mitigation will be enhanced by additional open water, mud flats, and wetland habitat in the mitigation site north of I-80. Also, if the South Shore Ecological Reserve is adopted, additional shore lands to the west and north of the mitigation site will preserve more land than is proposed for development and provide contiguous wildlife habitats throughout the region.

CULTURAL RESOURCES

The Project area is bounded on the north and west by Great Salt Lake mud flats. Extensive development is not likely near the Project area due to wetlands, soil conditions, a high ground water table, flood plain restrictions and strong odors from Great Salt Lake. As a result of previous surveys, the presence as well as the potential for historic properties in this area is well understood. To the east, north and west of the Project area, there are almost no historic properties and the potential for additional unrecorded ones is extremely low. In addition, much of this landscape has been severely disturbed by the development of salt evaporation facilities, landfills, and soil reclamation.

The Oquirrh Mountains bound the Project area to the south and above an elevation of about 4500 feet, the potential for historic properties is moderate to low. However, there is also little potential for development here, since the terrain is so steep. The greatest potential for cumulative cultural resource loss is in the region to the south and southwest of the Project area, between an elevation of 4300 and 4500 feet. There is a moderate to high potential for cultural resources in these areas which include the Permittee's present industrial facilities and the historic communities of Magna, Garfield, and Bacchus. In addition, this area has a high potential

for prehistoric sites, especially on the old lake terraces, adjacent caves, and rock shelters.

A variety of actions have contributed and continue to contribute to the loss of cultural resources in this area. These include the continuous upgrading of the Permittee's facilities; new residential development, especially in the area east of Magna; new mining exploration and development; and environmental cleanup of past industrial activities. It is estimated that between 5 and 10 historic properties are lost each year as a result of these combined actions. This amount represents only a small fraction of the estimated 850,000 historic properties in Utah. However, it does include a significant proportion of Utah's industrial mining-related heritage.

AIR QUALITY

The Project, following construction will result in a net decrease of fugitive dust emissions because the new impoundment will be smaller than the existing tailings impoundment (43 tons per year for the existing tailings impoundment to 30 tons per year for the proposed tailings impoundment, Utah Division of Air Quality Approval Order, July 14, 1995).

Modernization of the Permittee's smelter operation will also reduce emissions of particulate matter and other pollutants to the air.

Because Salt Lake County is a non-attainment area for PM_{10}, and other industries in the region each contribute some particulate matter and other pollutants to the air, there is a potential the additive effects of industries, agricultural practices, new development in the Salt Lake Basin, along with Permittee emission contributions, could have a cumulative effect on the region. However, the State of Utah has developed an implementation plan for controlling particulate concentrations in the ambient air to maintain levels below the National Ambient Air Quality Standards.

7. COMMITTED MITIGATION & MONITORING

The following mitigation will be or has been undertaken to reduce or eliminate impacts. Many of the mitigation measures have been incorporated in the Project design or are conditions to be met within the various federal, state, and local permits and approvals.

Vegetation - Project Site

Approximately 4,000 acres associated with the existing tailings impoundment will be reclaimed and revegetated within 5 to 10 years. Reclamation of the expansion area after closure of the mine in 30 years will re-establish upland vegetation on an additional 3,500 acres.

Aquatic Biota-Project Site

Mitigation measures for aquatic biota at the Project site include the use of best management practices during construction activities to reduce degradation of water quality, especially sedimentation, of the streams and canals and include the use of siltation fences and/or haybales in drainages to reduce silt entering the stream systems.

The increase in selenium concentrations in the West C-7 Ditch following Tailings Impoundment Expansion results in a prediction of high potential risk to birds. Consequently, the West C-7 Ditch water will be conveyed from its point of origin to where it is diluted by the Tooele water at the I-80 culvert in a manner that prevents exposure of birds and other wildlife to fish and macroinvertebrates that could have concentrated the selenium to toxic levels, thereby minimizing the risk to wildlife.

Ecological Risk Assessment

An Ecological Risk Assessment (ERA) is being conducted by Kennecott with oversight by the U.S. Environmental Protection Agency (EPA) and the Utah Department of Environmental Quality (UDEQ).

ERA results for 1995 sampling are presented in the FEIS which assesses current and future risk to waterfowl, shorebirds and Great Salt Lake brine shrimp from selenium and other metals on Kennecott property. ERA studies, sampling and monitoring are continuing and current work will be completed in late 1996. Results and recommendations will be available at that time. The scope of ERA studies and/or schedule may be extended pending review of results. A condition of the permit requires the results of the ERA studies to be provided to the Corps. If the ERA studies document adverse effects on the mitigation site, the Corps may require the Permittee to develop a corrective action plan or to implement alternative mitigation.

Wetland Mitigation Plan

The loss of 1,055 acres of jurisdictional waters, including wetlands will be mitigated through the restoration, creation, preservation and enhancement of an approximately 2,500 acre site along the south shore of Great Salt Lake north of I-80. Specific measures to be taken include:

1. Creating, restoring, enhancing and preserving approximately 2,500 acres of habitat as a means of generating 1,390.10 Habitat Units (HU's), a net gain of 108.4 (HU's), when compared to the total HU's provided by the existing Project and mitigation sites.

2. There will be 322 acres of shallow pond created and managed to provide enhanced shorebird forage and nesting opportunities. An additional 1,100 acres of saline playa, wetlands and playa

and wetland fringe will be enhanced by eliminating impacts from grazing and off-highway vehicles.

The principal functional value identified for mitigation site wetlands is foraging, roosting and nesting habitat for migratory shorebirds and waterfowl including special status species.

The improvements will be achieved primarily through manipulating water elevations in existing saline playas in order to increase macroinvertebrate prey production and availability.

3. Separate management areas, each with specific management prescriptions have been designated to guide the enhancement of the Mitigation site's ponds, streams, playas, uplands and artesian wells. The Permittee will allocate funds to support monitoring activities and long-term maintenance.

   Monitoring has begun to establish baseline conditions for selected avian species, vegetation water and soil chemistry and hydrology.

   Long-term monitoring will be conducted (1996 through 2000) to measure environmental changes from baseline conditions and the success of mitigation efforts. Annual monitoring reports will be submitted to the Corps.

In addition, mitigation required for a previous permit issued to the Permittee (Permit No. 199250147) will be accomplished within the context of this mitigation plan.

Surface Water

Mitigation for surface water quality impacts includes:

1. Closure of former salt evaporation ponds and improved treatment of smelter and refinery wastewaters by a new hydrometallurgical plant will result in a decrease of total contaminants discharged to Great Salt Lake relative to baseline conditions.

2. Estimated quality of water in the post-expansion West C-7 Ditch is expected to be generally better or comparable to baseline conditions, except for selenium, for which the concentrations are expected to increase. The estimated toxic threshold for brine shrimp is 0.200 mg/L of selenium. This concentration is estimated to be exceeded, post-expansion, in rare conditions when current operational practices (i.e. continuous discharge through UPDES Outfall 004) are suspended during a period of "worst case" high selenium discharge through UPDES Outfall 008. The effect of the increase in

selenium concentration will be localized. It is Projected that the mixing zone for the West C-7 outfall will extend less than 0.25 miles during calm weather conditions before transitioning to ambient lake concentration levels. Mitigation for this potential circumstance includes:

- The artesian Garfield well waters (i.e., ground water) with elevated selenium content will be addressed as part of a recent Memorandum of Understanding (MOU) among Kennecott, the EPA, and the UDEQ (September 27, 1995). The MOU provides that Kennecott will "start a Remedial Investigation/Feasibility Study (RI/FS) on the North Zone ground water problems (originating at the refinery and smelter sites) within one year of completion of the ecological and human health risk assessments, if such an RI/FS is shown necessary based on ecological and human health risk assessments. This RI/FS should be completed within three years after start."

- Should the Garfield well water mitigation under the above-mentioned agreement be completed by the date of the C-7 Ditch realignment tie-in (estimated 3rd quarter 1997), then no further action will be taken. If not completed, then Kennecott will: 1) construct a pipeline which will carry the UPDES Outfall 008 discharge to the culvert under I-80, 2) transport the waters from the Garfield wells with high selenium content to UPDES Outfall 008 in a manner which minimizes exposure to wildlife in the region of freshwater wildlife habitat south of I-80, and 3) during the brine shrimp hatching season (mid-late Spring through mid-late Fall), limit discharges to Great Salt Lake to dissolved selenium concentrations below 0.200 mg/L. A grab sample will be collected north of I-80 near the West C-7 Ditch culvert and will be analyzed for dissolved selenium in March and October, when ground water is being discharged through UPDES Outfall 008 from Garfield Wells No. 4 (NEG484) or No. 5 (NEG485). The purpose of the sampling will be to detect changes from the 0.200 mg/L concentration level.

3. Monitoring in lower Lee Creek will be performed to confirm that the Projected concentrations of heavy metals and other water quality constituents are valid. Monitoring will consist of the following:

   - A sampling station will be established in lower Lee Creek upstream of the proposed diversion structure and downstream of I-80. This station will be sampled during April, July, October, and January during the years 1996 through 2000 for the following parameters;

TSS, TDS, hardness, alkalinity, salinity, arsenic, boron, cadmium, copper, lead, selenium, and zinc.

If winter discharges are not continuous, January sampling at the lower Lee Creek station will be conducted during periods of Kennecott UPDES discharge. Should no UPDES discharges occur during the winter months, the winter sampling would not be required.

In addition, benthic sediments will be tested in April and October during the years 1996 through 2000 for the following parameters:

salinity, arsenic, boron, cadmium, copper, lead, selenium, and zinc.

- Dissolved selenium concentrations in lower Lee Creek will be monitored to assure that the concentrations remain below 0.012 mg/L. Should dissolved selenium exceed the defined level, Kennecott will be required to exhibit that UPDES Outfalls 001, 002, and 007 do not exceed this concentration. The 0.012 mg/L concentration for selenium is based on information from the mitigation area and a State Waterfowl Management Area (Farmington Bay) adjacent to Great Salt Lake which have shown selenium concentrations as high as 0.012 mg/L result in selenium residues in aquatic invertebrates consumed by birds of less than the 6 mg/kg threshold of concern. This value may be changed based upon the results of the Ecological Risk Assessment.

Ground Water

Kennecott received a Ground Water Discharge Permit (GWDP) from the State of Utah Division of Water Quality on December 21, 1995.

The GWDP sets forth conditions and limits for discharge control and groundwater monitoring.

Discharge control will be accomplished through:

- The presence of natural liners with small vertical hydraulic conductivities
- The small vertical hydraulic conductivity of the tailings themselves ($3x10^{-7}$ to $3x10^{-6}$ cm/s)
- Radial flow to and capture by the drainage blanket and associated drainage ditches.

Protection levels for ground water quality compliance monitoring will be set on a well-by-well basis, based, in part, on the background concentrations of monitoring constituents at each well.

The GWDP requires that ground water quality compliance samples be collected and analytical results reported quarterly. The Permittee is required by the GWDP to submit an Operational Monitoring Plan, within 90 days of permit issuance, which will identify the specific locations to be sampled and constituents to be analyzed as part of the operational monitoring plan. The Permittee is also required by the GWDP to submit a program, within 180 days of permit issuance, to conduct ongoing studies of acid generation potential of the tailings. Results of the operational monitoring program will be: 1) reviewed to identify long-term trends; and 2) used to evaluate the need for potential changes in BAT (best available technology) as part of the 5-year GWDP renewal process.

Earth Resources - Areal Settlement

New facilities will be sited outside the influence of potential areal settlement. Existing critical structures that cannot be relocated will be monitored for adverse settlement effects.

Earth Resources - Liner System

The expansion area would utilize the Upper Bonneville Clay as an *in situ* liner. Areas such as drainages where the thickness of the underlying clay is determined to be inadequate, would be infilled with clay to create a continuous *in situ* clay liner system.

Reclamation Plan

The Permittee will implement specific measures within a Reclamation Plan approved by the Division of Oil, Gas, and Mining, State of Utah, to mitigate the impacts to earth resources as a result of a new tailings impoundment. Mitigation includes soil erosion control, revegetation, and air quality maintenance through dust control. The plan includes a combination of reclamation activities throughout the construction, operation, closure, and post closure of the proposed tailings impoundment.

Proposed Kennecott North Zone Superfund Site

During September 1995, the EPA, Utah Department of Environmental Quality (UDEQ), and the Permittee reached an agreement whereby the EPA agreed to take no further action relating to the final Superfund listing of the Kennecott North Zone and South Zone and Kennecott agreed to perform several action items including the completion of environmental assessments and specified clean-up activities. This agreement is summarized in and documented by a Memorandum of Understanding (MOU) that was signed by representatives of the EPA, UDEQ, and the Permittee on September 27, 1995. The permittee will be required to provide the results of the studies to the Corps for review and evaluation. As appropriate, the Corps may require the permittee

to take corrective action or to implement alternative mitigation based on the results of the studies.

Soil Contamination

1. Kennecott will address soil contamination in the Union Pacific Railroad Road Right-of-Way maintenance yard following relocation of the railroad tracks. If petroleum contaminated soils are determined to require removal, the Permittee will work with the State Division of Environmental Response and Remediation (DERR) to remove the contaminated soils in compliance with applicable State regulations.

2. Kennecott acquired the Chevron facility in mid-1994. PCB and asbestos containing material, as well as miscellaneous waste left on site by the former facility operator, were removed and disposed in 1994 in accordance with applicable regulations. Beginning in May 1995, a Kennecott contractor initiated demolition and clean-up of the former phosphogypsum fertilizer plant. Some hydrocarbon soil contamination was identified and the Permittee is working with the State Division of Environmental Response and Remediation (DERR) to mitigate the conditions. Should any additional items requiring mitigation be identified during site preparation for the proposed tailings Project, Kennecott will be required to address them in accordance with applicable laws and regulations.

Historic Resources

Mitigation for three National Register of Historic Places (NRHP) eligible sites will be conducted through a data recovery process. The three sites affected by the Project are: the abandoned Salt Lake Garfield and West Railroad, the realigned Union Pacific/Los Angeles and Salt Lake Railroad, and the realigned Western Pacific Railroad.

Kennecott will conduct data recovery as described in the Data Recovery Treatment Plan (approved by the Utah State Historic Preservation Office on November 13, 1995) prior to the start of construction and resulting impact to historic properties.

Air Quality

An Air Quality Approval Order from the Utah Division of Air Quality was granted to Kennecott on July 14, 1995 with conditions. The conditions address the construction and operation of the tailings impoundment and measures for fugitive dust control, wind erosion control, and inspection and reporting requirements.

Kennecott will comply with conditions of the Approval Order and Rule R307-1-4.5 UAC which addresses fugitive emissions and fugitive dust control requirements.

8. CONSIDERATION OF COMMENTS RECEIVED

The Draft Environmental Impact Statement (DEIS) was mailed on April 28, 1995 to 125 agencies, organizations, individuals, libraries, and media.

The Corps received 17 comment letters consisting of a total of 379 comments on the DEIS. Responses are contained in Volume II of the Final EIS entitled Comments Received on Draft EIS and Responses.

Five letters and two comment forms were received in response to the FEIS during the mandatory waiting period. A public hearing on the 404 Permit was held on January 18, 1996. Five persons offered oral comments into the public hearing record. A transcript of the hearing was prepared.

UTAH DIVISION OF WATER QUALITY

Comment:

The Utah Division of Water Quality (UDWQ), in a letter dated January 25, 1996 suggested there may be a better alternative to reduce the risk of significant selenium concentration in the West C-7 Ditch than that proposed in the FEIS. The UDWQ suggested that Garfield wells NEG484 and NEG485 be used as process water or seal water. Other Garfield water sources with selenium concentrations of less than 0.020 mg/L could be discharged to the West C-7 Ditch, thus avoiding the need to pipe waters to the I-80 freeway crossing and the need to sample and monitor selenium concentrations in the West C-7 Ditch and Lake Discharge #1 to Great Salt Lake.

Response:

The pumping of Garfield Wells NEG484 and NEG485 to the impoundment was considered and rejected in the EIS discussions. The primary reason is that the noted 80% reduction in selenium in the tailings impoundment applies only to selenium with a +4 valence (p. F-10 of the FEIS). The valence of the selenium in the Garfield well water is estimated to be primarily +6. Placing these waters into the impoundment would likely increase the Projected winter selenium loading to the impoundment by a significant amount (four to five times), resulting in a significant change in discharged selenium concentration from the tailings impoundment versus the current conditions. A goal of the defined alternative was to minimize impacts versus existing conditions, hence the winter discharge of the Garfield well artesian flows to the impoundment was not considered to be practicable.

Additional studies are being conducted to further evaluate the fate and reduction mechanism of selenium in the tailings impoundment. Also, further characterization of the dissolved concentrations and aqueous speciation of selenium in waters from several points in the

Kennecott processing circuit, including the Garfield artesian wells, is being conducted. This work is included as part of the Ecological Risk Assessment outlined in a Memorandum of Agreement between the Environmental Protection Agency (EPA), the Utah Department of Environmental Quality (UDEQ), and Kennecott as discussed in the FEIS.

Should the above mentioned studies demonstrate that acceptable water quality in the tailings impoundment discharge, and hence lower Lee Creek and the mitigation site, can be maintained with the placement of water from NEG484 and NEG485 on the tailings impoundment, this seal water source would be a logical alternative. At this time, this optimistic result cannot be demonstrated. The mitigation suggested in the FEIS was intended to allow for the continuation of work under the Ecological Risk Assessment and the RI/FS, as well as provide mitigation should this work not be completed prior to the date of Project impacts. Existing surface water flow patterns (i.e., the C-7 Ditch) are expected to be diverted during the third quarter of 1997.

EPA REGION 8

Comment:

EPA (letter dated January 29, 1996) stated that the FEIS addressed most of their concerns. However, they indicated that they still had concerns regarding the potential for bioaccumulation of selenium. They further stated that they were confident that the CERCLA process, proposed mitigation and monitoring plans and 404 permit conditions could address significant issues which may be identified during the ongoing Ecological Risk Assessment.

Response:

The conditions of the Section 404 permit will require completion of the Ecological Risk Assessment and reporting of results to the Corps as well as EPA. Also Section 404 permit conditions require monitoring of selenium and other constituents of concern. Conditions will state that if levels are trending above predictions presented in the FEIS or levels have increased to harmful levels or effects on birds are observed, a corrective action plan will be required to be developed and implemented by Kennecott.

NATIONAL AUDUBON SOCIETY

Comment:

The National Audubon Society stated that the Corps and Kennecott should be congratulated for efforts to put together the best information available to make a decision.

Audubon did point out that an error was made in the FEIS about the estimate of combined loading of selenium into the Great Salt Lake from Kennecott operations. The estimate should have been 20% not 2% of

total selenium loading from Kennecott operations to the Great Salt Lake.

The Audubon Society recommended that Kennecott analyze all possible ways to minimize selenium discharges into Great Salt Lake.

Response:

The 20% total selenium loading from Kennecott Operations to the Great Salt Lake the Audubon Society quoted from the public hearing on January 18, is a very conservative, unconfirmed estimate which assumes that the average concentration of selenium in inflowing surface water is 0.002 ppm (mg/L). This concentration purposely excludes agricultural and other industrial sources. For example, samples taken from the Farmington Bay Waterfowl Management Area in the summer of 1995, indicated inflowing water concentrations up to 0.015 ppm (mg/L). As such, total loading to the lake rom inflowing waters could range from 4,700 kg to 35,000 kg. Additionally, not all water and selenium leaving Kennecott's property originated on-site. Therefore, Kennecott's contribution of total selenium loading to the lake could range anywhere from 2.7% to 20.7%, depending on which assumptions are used in the calculations.

U.S. FISH AND WILDLIFE SERVICE

Comments:

The U.S. Fish and Wildlife Service in a letter dated January 31, 1996 provided the following comments and concerns:

1. Concern still exists that reduced flows in the C-7 Ditch and elevated levels of selenium will cause harm to birds nesting or feeding in the ditch. The USFWS stated that monitoring of the C-7 Ditch and surface and ground water associated with the tailings pile should be required along with contingency plans detailing what will be done to protect migratory birds.

2. No methods or maps of sample collection sites or quality assurance/quality control (QA/QC) data on analytical procedures and results were presented. The USFWS believes the data presented on sediments and the variability in selenium levels suggest that data uncertainties exist or that inadequate levels of sampling occurred. Furthermore, information on water flow at the mitigation site was not presented and no significant "within" site variability at compared sites was shown. None of the data are complimentary and the results ask more questions than they resolve regarding selenium concentrations at the mitigation site.

3. Water conductivity data were reported for Blackhawk Pond but not the waterfowl management areas. The concern is salinity of water at Blackhawk Pond may be high for waterfowl. The

USFWS questions the validity of conductivity data collected on June 19 for Blackhawk Pond and the Northpoint Canal.

4. Red-winged and yellow-headed blackbirds are not representative of the exposure that could be occurring to shorebirds or other water birds and waterfowl. The sample size for stilt and avocet eggs was too small to draw definitive conclusions.

5. Future management options for the mitigation area could be restricted to more salt tolerant species. The mitigation site needs to be evaluated to ensure that enhancement of wetland units by bringing in additional water does not aggravate any existing selenium problems or attract waterbirds into areas containing hazardous levels of selenium.

6. Water quality data for the North Point Canal, with the exception of a single sample, were not presented in the FEIS. The data presented were inadequate to explain the source of selenium in the Blackhawk Pond.

7. The issue of potential effects to migratory birds feeding on brine shrimp and eggs while staging prior to migration has not been resolved. The USFWS also believes the question of whether other trace elements affect brine shrimp hatchability and survival has not been adequately addressed.

8. The USFWS recommended the following actions be incorporated into the Record of Decision for approval of the permit:

   a. Trace element concentrations in the C-7 Ditch should be reduced to nonhazardous levels.

   b. A monitoring plan should be developed to collect samples of water, sediment, and biota (aquatic invertebrates, fish, possibly waterbird eggs) from the C-7 Ditch, at the mitigation site, and in Great Salt Lake and analyzed for trace elements. This monitoring plan should be appropriately designed for each of the water bodies mentioned above. This should begin before the Project is initiated and continue annually for a minimum of 6 years after completion of the mitigation, to ensure that contaminants are not building up to harmful levels. In addition to an analytical monitoring program, a reproductive monitoring program should be conducted in the area to ensure that reproductive effects (e.g. embryo teratogenesis, reduced hatchability, death) are not occurring which may not be predicted through the analytical monitoring program.

   c. Surface runoff and groundwater associated with the tailings pile should also be included in the monitoring program to ensure that these transport mechanisms do not

become part of an exposure pathway to migratory birds either in the C-7 Ditch, at the mitigation site, or in Great Salt Lake.

d. A thorough evaluation of surface and ground water quality at the mitigation site should be conducted to ensure that enhancement of wetland units by bringing in additional water does not aggravate any existing selenium problems, or attract waterbirds into areas containing hazardous levels of selenium.

e. A plan should be developed, prior to Project implementation, detailing steps that will be taken to lower trace element concentrations if data from the monitoring program indicates that one or more trace elements have increased to levels harmful or effects to migratory birds are observed.

Response:

1. The FEIS states (page 3-55) that "The West C-7 Ditch water will be conveyed from its point of origin to where it is diluted by the Tooele water at the I-80 culvert in a manner that prevents exposure of birds and other wildlife to fish and macroinvertebrates that could concentrate the selenium to toxic levels, thereby eliminating the risk to wildlife.

   This mitigation measure and conditions requiring monitoring and corrective action will be added to the permit to address the USFWS concerns.

2. QA/QC information was not included in the EIS due to its detail and length. This information is contained in the source reports used in the preparation of the EIS. QA/QC information from results of the Ecological Risk Assessment studies is available from the EPA and is on file with the Corps, Utah Regulatory Office.

3. Additional water conductivity data, as measured in umho/cm, for the mitigation area and the existing waterfowl management areas are as follows:

   Blackhawk Pond - low - 3,150 to high - 45,500 (the range in Blackhawk Pond is related to seasonal drying of the pond. This seasonal cycle will be eliminated following development of the mitigation plan which provides for a maintenance of a minimum pool level)

   North Point Canal - 1,017 to 5,820

   Farmington Bay - from low thousands to hundreds with a minimum of 328.

Timpie Springs - 13,730 to 19,210.

Ecological Risk Assessment studies will provide additional data on conductivities. These data are expected to be available in late 1996. The Corps will add a condition to the permit that states if studies document adverse effects on mitigation site that the Corps, in cooperation with EPA and USFWS will evaluate the results and either require further investigation or remedial and corrective action to be taken by Kennecott.

4. Additional data on selenium in bird eggs are being collected and will be included in upcoming ecological risk study reports.

5. Data regarding this concern were presented in the FEIS, Appendix E. The Corps will include a condition in the permit to require monitoring of water quality and the effectiveness of the mitigation plan. Based on monitoring results, the Corps may require corrective action or alternative mitigation.

6. Additional water quality data for Blackhawk Pond and the North Point Consolidated Canal are being collected and will be evaluated along with other data as part of the ecological risk assessment. The data will be available upon request from the Corps.

7. Based on the analyses presented in Appendix E to the FEIS, the Projected concentrations of selenium in the mitigation area are not predicted to adversely affect shorebirds or waterfowl. However, the Corps agrees that this issue is still unresolved. Data and analysis from the ongoing ecological risk assessment will add more information that will be reviewed in monitoring the status of shorebirds and waterfowl using the mitigation area.

8. The Corps intends to include conditions in the permit which address the USFWS recommendations.

JIM BRUSSATTO - MAGNA AREA COUNCIL

Comment:

Mr. Brussatto submitted a comment form stating that concerns expressed by the Saltair Resort should be resolved by co-operation rather that confrontation.

Response:

Comment noted.

CAL KEETCH

Comment:

Mr. Keetch submitted a comment form stating that the plan for the mitigation site did not include access for waterfowl hunting. He would like to see controlled hunting access on the mitigation site.

Response:

Hunting is not included in the plan for the mitigation site because it was determined that such an activity would interfere with the mitigation objectives. The Habitat Evaluation Procedures (HEP) were used to calculate Habitat Units (HU's) as a way to measure losses on the Project site and to assess the gain in habitat value on the mitigation site. It was felt that the disturbance associated with hunting would affect the one of the objectives of mitigation: preserving, restoring, enhancing and creating aquatic habitat. The gain in HU's to address this objective on the mitigation site were predicated upon restricting human disturbance. This included the removal of off-highway-vehicle use as well as hunting. To allow hunting on the mitigation area would in effect reduce the HU's available to offset habitat losses on the Project site.

PLUMB & DALTON (GREAT BASIN EARTH SCIENCE)

Comment:

In a letter dated January 18, 1996, submitted at the public hearing, Plumb & Dalton (Attorneys at Law) representing Great Salt Lake Corporation (owner, operators of Saltair Resort and beach) requested an extension of the 30-day no action period to allow additional time for review of the FEIS. Attached to the Plumb & Dalton letter is a letter from Great Basin Earth Science (GBES); consultants to Plumb & Dalton.

GBES stated they completed a preliminary review of the FEIS and that the Corps addressed GBES comments on the Draft EIS in a thorough and substantial manner. GBES had two areas of concern with regard to the FEIS, 1) substantial revisions to technical information in DEIS and 2) a significant amount of additional new technical information incorporated into the FEIS. GBES recommended that Plumb & Dalton request an extension to 30-day no action period prior to issuance of the ROD to give them additional time to review the FEIS.

Response:

The FEIS was mailed to interested parties on December 18, 1995. At the public hearing on January 18 1996, the Corps announced that the comment period remained open until January 29, 1996, a period of 41 days. As of the date of this ROD no comments were received from Plumb & Dalton or GBES.

As noted in the response to comments on the DEIS, the Corps does not believe that the FEIS contained substantial new information that warranted issuance of a supplemental DEIS. As a result of comments received on the DEIS, additional information was gathered to further substantiate the findings presented in the DEIS. The additional information and research did not alter the conclusions arrived at in the DEIS but served as further confirmation of those conclusions. In any event, all comments on the FEIS have been considered by the Corps in making a decision on the application and have been addressed in this Record of Decision.

PUBLIC HEARING

Five speakers offered oral comments into the public hearing record on January 18, 1996. A summary of each speaker's comments is presented below.

James Brussatto

Mr. Brussatto, a Magna area resident and chairman of environmental committees for the Magna Area Council and Magna Chamber of Commerce stated that Kennecott had been cooperative in addressing area environmental concerns.

Response:

Comment noted.

John Williams - LASER

Mr. Williams stated that the Final EIS responded to many of the concerns and comments on the Draft EIS, however, some concerns still remained:

1. The bioaccumulation study (Appendix E) was not sufficiently conservative.

2. Corps should add as permit conditions recommendations by the Department of Interior in their DEIS comment letter dated June 23, 1995:

    a. Water, sediment and biota on mitigation site should be sampled and analyzed for trace elements before the Project and for 6 years after development of mitigation site.

    b. Samples should be analyzed at laboratories capable of tissue contaminant analysis.

    c. Tailings expansion and wetlands mitigation should be coordinated with ongoing ecological risk assessment studies and contaminants in Project area cleaned up.

3. LASER is still concerned about Wetland acreage loss due to the Project, and believes there should be an increase in the amount of wetlands created as mitigation.

4. Encouraged monitoring of mitigation site beyond 5 years as stated in FEIS.

5. LASER is still concerned about particulate emissions blowing from tailings impoundment that will contain toxic pollutants in the form of metals.

Response:

1. See response to USWFS comment no. 7 above.

2a. A five year monitoring program beginning in 1996 will be included in the permit conditions. At the end of five years, the Corps will evaluate on an annual basis the need for continuation of monitoring and reporting. This condition will be incorporated into the permit.

2b. The Corps will require the submittal and approval of a sampling and monitoring plan for the mitigation site. Tissue contaminant analysis will be considered and decided upon during review of the sampling and monitoring plan.

2c. The permit will include a condition regarding completion of the Ecological Risk Assessment Studies and coordination with tailings impoundment and wetlands mitigation.

3. The Corps will require the Permittee to recalculate the Habitat Units impacted by construction. If HU's impacted are more than Projected, the Corps may require additional mitigation.

4. See response to 2a.

5. The Air Quality Approval Order from the Division of Air Quality contains specific conditions and standards adequate for fugitive dust and particulate emission control and reduction. Compliance with these conditions will be required in the permit.

<u>Wally Wright</u> - Member Great Salt Lake Tech Team
- Board Member Magna Tourism Development Committee
- Part-owner Saltair Resort

Mr. Wright stated he was not opposed to the Project but still had some concerns that he felt were not addressed in the FEIS.

1. Prefers the east expansion alternative rather than the west because it would impact the Great Salt Lake State Park and Saltair resort much less.

2. The tailings impoundment expansion will create a substantial visual impact and will cause socioeconomic impact (economic loss) on tourism at Great Salt Lake State Park and tourism.

3. The saturated beaches are affecting tourism and the problem created by I-80 and lack of drainage was not mitigated in the EIS.

4. Suspicious that water on beaches is being aggravated by applications of water on tailings impoundment finding its way under the freeway to the beaches and that expansion of the tailings impoundment will introduce more water making further development of the beaches impossible.

5. Wants additional analysis of visual impact and economic effects on tourism.

6. Remains concerned about ground water seepage from toe of impoundment. Does not accept modeling results.

Response:

1. Section 404(b)(1) Guidelines require the Corps to select the least damaging, practicable alternative. Consistent with this requirement, the Corps selected the North Expansion West alternative since it affects 663 fewer acres of wetlands than the North Expansion East alternative.

2. A component of the permitted Project includes the construction of several visual buffer berms as a means to mitigate visual impacts. The berms will be landscaped with trees, shrubs and grasses. In addition, the tailings embankment will be reclaimed concurrently with development.

3. The studies of groundwater conditions presented in the FEIS conclude that the existing tailings facility, as well as the proposed tailings impoundment, have not and will not create problems of water saturation on the beaches. As a result, mitigation of those beach conditions will not be required by the Corps.

4. See response to comment no. 3.

5. See response to comment no. 2.

6. See response to comment no. 3.

Chris Fessler - Manager Saltair Resort

Mr. Fessler's concerns are similar to Mr. Wrights; saturated beaches and odor problem that will get worse with tailings impoundment expansion and visual impact of tailings impoundment. Mr. Fessler asked that additional visual mitigation on the north side of I-80 be made a condition of the permit.

Response:

See responses to Mr. Wright's comments above.

Wayne Martinson - National Audubon Society

Mr. Martinson said he was glad a wording change was made in the FEIS to state that cumulative impacts resulting from discharge of pollutants to the Lake from all discharges is a much bigger issue than can be addressed in the EIS.

Also, stated that the estimate of combined loading of selenium into Great Salt Lake from Kennecott operations should have been 20% not 2% and every effort should be made to decrease the amount of selenium being discharged to the Lake.

Response:

The estimate of combined loading of selenium to the Great Salt Lake from Kennecott operations could range anywhere from 2.7% to 20.7%, depending on assumptions make about the average concentration of selenium in inflowing waters from all sources. The 20% assumed a conservative selenium concentration of 0.002 ppm (mg/L) in inflowing water and did not include agricultural and industrial sources. It also assumes that all water coming out of Lake discharges #1 through #3 is Kennecott water, when in fact some of the selenium originates off-site. The other comments make by the Audubon Society are noted.

10. CONDITIONS

The following conditions, related monitoring, and best management practices will be included and made part of the Permit.

The conditions are grouped by resource area or issue.

1 Jurisdictional Wetlands and Other Waters of the United States - Wetland Mitigation

1-1 The Wetland Mitigation Plan, as presented in Appendix B of the Final Environmental Impact Statement, will be implemented in its entirety as the means of mitigating the loss of wetlands and other waters of the United States from the Tailings Modernization Project North Expansion West (Proposed Project).

1-2 The permittee shall initiate implementation of the Wetland Mitigation Plan before or concurrent with construction activities of the tailings expansion Project. Within 60 calendar days after completion of construction, the permittee will provide the Corps with an as-built survey of the mitigation site.

1-3 The permittee shall submit an annual report for five years following completion of Phase I and Phase II of the mitigation plan. It will present the findings of mitigation site monitoring to assist in the tracking and evaluation of the success of mitigation efforts. After completion of five years of monitoring, the Corps will evaluate, on an annual basis, the need for continuation of monitoring and reporting. If the sampling and monitoring indicate that levels of constituents of concern (Total Dissolved Solids, salinity, arsenic, boron, cadmium, copper, lead, selenium and zinc) are trending above predictions of future water quality presented in the FEIS, or one or more trace elements have increased to harmful levels or effects to migratory birds are observed, the permittee will be required to develop and submit to the Corps a corrective action plan. The Corps will review and approve the plan and will require its implementation and/or alternative mitigation.

1-4 If the mitigation site does not meet the objectives established in the Mitigation Plan due to aberrant local conditions, the permittee may be required to develop alternative mitigation. The permittee agrees to develop and implement corrective actions or alternative mitigation, in cooperation with the Corps, in order to meet the objectives established in the original mitigation plan.

1-5 The permittee shall provide for a long term financial commitment to support monitoring activities (avian species, plant communities, macroinvertebrates, water and soil chemistry, hydrology, and photodocumentation) and for management and maintenance of the mitigation site so that functions and values of the site (food chain support, wildlife habitat and forage and wetland vegetation as habitat) are maintained in perpetuity.

1-6 Mitigation Plan Implementation

Phase 1 - (Site Access Control, Cleanup, Livestock Removal, Mitigation of Baseline Monitoring Studies) and Phase 2 - (Site Modifications for the Enhancement and Creation of Aquatic Habitats involving water delivery system improvements as specified in the mitigation plan) will be completed within one year of the date of the permit issuance. Phase 3 - (Monitoring) will consist of the following physical and

biological categories and monitoring activities as described in the Wetland Mitigation Monitoring Plan.

- Avian Species
- Macroinvertebrates
- Plant Communities
- Water and Soil Chemistry
- Hydrology
- Mitigation Site Access Control and Maintenance

Phase 3 monitoring will commence immediately upon completion of Phases 1 and 2. Monitoring will continue through the 3rd quarter (September) of each year that monitoring is required.

The permittee will submit an annual report by **December 31** for five years following completion of Phases 1 and 2. After the completion of the five year monitoring program, the Corps will evaluate the need for continuation of monitoring and reporting.

1-7 In order to create and enhance aquatic habitats at the mitigation site and to maintain the mitigation site in perpetuity, the permittee shall construct and maintain a water management system consisting of required water diversion structures, ditches, dikes, control gates etc. to control mitigation site hydrology and pool elevation. Dredging may be required to hydrologically link some ponds. The permittee shall submit to the Corps all general arrangements, sections, the contractor's stormwater pollution prevention plan and water budgets for review, comment and approval prior to the start of construction. At the completion of construction the permittee will submit as-built drawings and operational manuals.

1-8 The permittee shall permanently guarantee all necessary water rights to maintain the hydrology necessary to best provide and maintain the environmental functions and values of the mitigation site as set forth in the Mitigation Plan.

1-9 Normal and 100-year flood discharges are expected to increase in the lower Lee Creek drainage. The increased discharge could affect adjacent privately owned lands to the west of the mitigation site before discharging into Great Salt Lake. The permittee shall divert existing normal and flood flows around private land and discharge them directly from the mitigation site through property owned by Kennecott to the Great Salt Lake. The permittee shall construct a diversion structure to discharge existing Lee Creek flows through adjacent private land. The permittee shall submit general arrangements and sections for the Lee Creek diversion structure to the Corps for review, comment and approval prior to the start of construction. At the completion of construction the permittee

will submit as-built drawings and operational manuals. In the event Kennecott secures the permission of the landowner(s) to discharge the excess flows from the mitigation site and lower Lee Creek across private property, this condition may be eliminated.

1-10 The permittee shall conduct an investigation of the jurisdictional wetlands and other waters of the U.S. that were actually lost on the Project site following construction of the Tailings Modernization Project.

The permittee will, at the end of the 5 year monitoring period, recalculate (using the Habitat Evaluation Procedure - HEP) the Habitat Units (HU's) impacted by construction and submit a report to the Corps of Engineers. If the Habitat Units impacted are less than Projected in the Mitigation Plan, Kennecott may choose to bank the Habitat Units on the mitigation site. If the Habitat Units impacted are more than Projected, the Corps may require additional mitigation.

Additionally, mitigation required for Permit No. 199250147 may be included in this mitigation plan. The Permittee must be able to demonstrate that the predicted HU's from the mitigation plan for Permit No. 199250147 can be provided in addition to the HU's Projected to accrue from the mitigation plan for this Project (Permit No. 199450301). Documentation that the additional HU's necessary to satisfy the conditions of Permit No. 199250147 are available on the mitigation site (Permit No. 199450301) shall be provided prior to the start of construction of the mitigation area.

1-11 The permittee shall survey and record the mitigation area with the County Recorder. The survey shall contain a legal description of the mitigation area and a deed restriction identifying the site as a wetland mitigation area in perpetuity. A copy of the attached record of conditions, covenants and restrictions shall be recorded with the County Recorder and a copy of the recordation will be provided to the Utah Regulatory Office within ninety (90) days of receipt of this permit.

2 **Vegetation on Mitigation Site**

2-1 The permittee shall employ Best Management Practices during construction activities to facilitate revegetation efforts by reducing the amount of surface disturbance and soil erosion. The permittee shall include a list and description of Best Management Practices (the BMP) in the design and construction specifications for the mitigation site. The BMP's will be reviewed and approved by the Corps.

The Corps at its option will inspect construction activities at the mitigation site and following construction to determine if BMP's have been employed and are effective.

3 **Aquatic and Wildlife Biota on Mitigation Site and Water Quality Sampling**

3-1 The permittee will conduct a water quality monitoring program to monitor incoming water to the mitigation site as the current levels of selenium are near the predicted toxicity threshold to wildlife of 6 ppm (mg/kg). The Permittee will prepare and submit a sampling and monitoring plan to the Corps, along with copies to EPA and USFWS for review and approval prior to initiation of sampling. The monitoring program will sample for heavy metals and other water quality constituents as described below.

- A sampling station will be established in lower Lee Creek upstream of the proposed diversion structure and downstream of I-80. This station will be sampled during April, July, October, and January during the years 1996 through 2000 for the following parameters;

  TSS, TDS, hardness, alkalinity, salinity, arsenic, boron, cadmium, copper, lead, selenium, and zinc.

If winter discharges are not continuous, January sampling at the lower Lee Creek station will be conducted during periods of Kennecott UPDES discharge. Should no UPDES discharges occur during the winter months, the winter sampling will not be required.

In addition, benthic sediments will be tested in April and October during the years 1996 through 2000 for the following parameters:

salinity, arsenic, boron, cadmium, copper, lead, selenium, and zinc.

Additional parameters for testing may be required if it is determined such parameters are necessary to more fully evaluate conditions on the mitigation site. Test results will be submitted to the Corps of Engineers within six weeks of collection. The Corps at its option may extend the requirement for sampling beyond the year 2000.

- Dissolved selenium concentrations in lower Lee Creek will be monitored April, July, October and January from 1996 through 2000 to assure that concentrations remain below 0.012 mg/L. Should dissolved selenium

exceed the defined level, Kennecott will be required to exhibit that discharge from UPDES Outfalls 001, 002, and 007 do not exceed this concentration. The 0.012 mg/L concentration for selenium is based on information from the mitigation area and a State Waterfowl Management Area (Farmington Bay) adjacent to Great Salt Lake which have shown selenium concentrations as high as 0.012 mg/L in freshwater habitats result in selenium residue in aquatic invertebrates consumed by birds of less than the 6 mg/kg threshold of concern. This value may be changed based upon the results of the Ecological Risk Assessment.

The sample results will be submitted to the Corps within six weeks of collection. The Corps at its option may extend sampling beyond the year 2000.

If sample results of discharge from outfalls 001, 002 and 007 exceed 0.012 mg/L of selenium, the permittee will prepare and submit a corrective action plan and schedule to reduce selenium concentrations. The permittee will report on the results and success of the corrective action(s) in reducing selenium concentration within 30 days of submission of the plan.

3-2 The permittee will complete current work on the Ecological Risk Assessment studies and development of recommendations by October 1996. Potential risk to receptors of concern will be presented in a risk characterization report that will be distributed to the EPA, U.S.F.W.S. and the Corps.

If the Ecological Risk Studies document adverse effects on Great Salt Lake, mitigation site or the Project site ecological resources, the Corps, in cooperation with the EPA, will evaluate the results for further investigation and remedial and corrective action to be taken by the permittee.

4 <u>Aquatic and Wildlife Biota and Water Quality Sampling - West C-7 Ditch and Lake Discharge #1.</u>

4-1 The artesian Garfield well waters (i.e., ground water) with elevated selenium content will be addressed by the permittee as part of the field work to be conducted under the terms of the Memorandum of Understanding (MOU) between the permittee (Kennecott), the USEPA, and the UDEQ (September 27, 1995). The MOU provides that Kennecott will "start a Remedial Investigation/Feasibility Study (RI/FS) on the North Zone ground water problems (originating at the refinery and smelter sites) within one year of completion of the ecological and human health risk assessments if such an RI/FS is shown

necessary based on ecological and human health risk assessment. This RI/FS will be completed within three years after start."

4-2 Should the Garfield well water mitigation under the Memorandum of Understanding be completed by the date of the C-7 Ditch realignment tie-in (estimated 3rd quarter 1997), then no further action is required by the permittee (Kennecott). If it is not completed, then Kennecott will: 1) construct a pipeline which will carry the UPDES Outfall 008 discharge to the culvert under I-80; 2) transport the waters from the Garfield wells with high selenium content to UPDES Outfall 008 in a manner which minimizes exposure to wildlife; 3) during the brine shrimp hatching season (mid-late Spring through mid-late Fall), limit dissolved selenium discharges to Great Salt Lake to concentrations below 0.200 ppm (mg/L). A grab sample will be collected north of I-80 near the West C-7 Ditch culvert and will be analyzed for dissolved selenium in March and October, during months when ground water is discharged through UPDES Outfall 008 from Garfield Wells No. 4 (NEG484) or No. 5 (NEG485). The purpose of the sampling will be to document concentrations and take appropriate action if water concentration of selenium exceeds 0.200 ppm (mg/L).

The permittee will submit to the Corps design and specifications for the pipeline that will carry UPDES Outfall 008 discharge.

The permittee will submit to the Corps the results of samples collected north of I-80 near the West C-7 ditch culvert to support that selenium concentrations during the brine shrimp hatching season are below 0.200 ppm (mg/L).

If sample and monitoring results are at, or exceed 0.200 ppm (mg/L), the Permittee will prepare and submit a corrective action plan and schedule to reduce selenium concentration to the Corps for review and approval. The Permittee will report on the results and success of the corrective action(s) in reducing selenium concentration within 30 days of approval of the plan.

If the results of the Ecological Risk Assessment studies show that the selenium concentration threshold value of 0.200 ppm (mg/L) should be modified, the Permittee will ensure that the selenium concentration is kept below the modified threshold.

5 UPDES Permit

5-1 The State of Utah, Division of Water Quality, Department of Environmental Quality requires that discharges from the facility be regulated under a Utah Pollutant Discharge Elimination System (UPDES) permit.

Kennecott has been granted UPDES Permit (No. UT0000051) effective February 5, 1995 through January 31, 2000. The permit authorizes discharges of effluent containing constituents within specific limits to 15 designated outfalls during operation.

Failure to comply with all effluent limits and monitoring, recording and reporting requirement, including the Stormwater Pollution Prevention Plan and compliance responsibilities and general requirements of the above referenced UPDES permit may result in the modification, suspension or revocation of the Corps' permit.

The permittee shall submit a copy of the Stormwater Pollution Prevention Plan developed for the North Expansion site to the Corps prior to the start of construction activities.

5-2 The State of Utah, Department of Environmental Quality, Division of Water Quality has granted Kennecott a "UPDES General Permit for Stormwater Discharge from Construction Activities that are Classified as Associated with Industrial Activity (Permit No. UTR 100301). The permit is effective February 1, 1996. The permit and authorization to discharge expires February 1, 1999.

The permit authorizes the discharge of storm water from construction activities to Lee Creek/C-7 Ditch and West C-7 Ditch.

A Stormwater Pollution Prevention Plan is required to identify potential sources of pollution including sediments and to provide erosion and sediment controls, waste disposal controls and stormwater management practices that will prevent pollution. Failure of the permittee to comply with all requirements, conditions, management practices and Stormwater Pollution Prevention Plans required by the above referenced DWQ Stormwater Discharge Permit for construction activities may result in the modification, suspension or revocation of the Corps' permit.

6 Section 401 Water Quality Certification

6-1 The permittee has received and agrees to comply with the provisions of the Section 401 Water Quality Certification granted by State of Utah Division of Water Quality on December 23, 1994, State I.D.U.T. 941006-010.

7 Groundwater

7-1 The tailings impoundment expansion area is underlain by a 9-15 foot thick Bonneville Clay layer. The Bonneville Clay will

be used as an *in situ* liner. Some areas, such as drainages have been identified where the underlying clay layer is less than 3 feet thick.

In order to ensure protection of groundwater quality the permittee will fill and properly compact areas where the clay layer is less than 3 feet thick with material necessary to create a continuous *in situ* clay liner system or to make the minimum thickness 3 feet or greater. The locations of filling and the date of completion will be included in the annual status report to the Corps.

7-2 The State of Utah, Department of Environmental Quality, Division of Water Quality has granted Kennecott a Groundwater Discharge Permit for the operation of the tailings impoundment (Permit No. UGW350011). The permit was granted on December 21, 1995. The permit and authorization to operate are subject to a 5-year permit renewal process. The referenced permit expires December 21, 2000.

The permit applies to the protection of groundwater through the control of waste streams and the implementation of Best Available Technology Performance Standards for the existing impoundment, North Expansion and Diving Board area south of State Road 201, and east of the Kennecott North Concentrator. The permit also establishes construction and operational monitoring requirements, monitoring frequency, reporting requirements, and out of compliance status compliance schedules. It also includes an Acidification Potential Assessment Monitoring Plan and an Operational Monitoring Plan.

Failure of the permittee to comply with all conditions of the Ground Water Discharge Permit No. UGW350011 may result in the modification, suspension or revocation of the Corps' permit, The permittee shall submit an annual report summarizing the status of compliance with groundwater monitoring and operational monitoring to the Corps.

8 Dam Safety

The State of Utah, Department of Natural Resources, Division of Water Rights has granted Kennecott a Dam Safety Permit (No. UT00432). Approval was granted August 10, 1995. The permit approves the plans for the tailings dam in terms of safety of the design. Conditions of the approval include: 1) notifying the State Engineer prior to the initiation of construction when the work will be conducted on the tailings dam and the name of the contractor 2) monthly submittal of all materials tests, and inspection reports 3) approval by the State Engineer of any modifications to construction plans 4) notification for foundation inspection prior to placement of fill material on the foundation. Annual reports are required for any year the dam is raised.

The Permittee shall submit a report summarizing the status of compliance with conditions of the Dam Safety permit, in its annual report to the Corps.

9 **Division of Oil, Gas and Mining (DOGM) Permit and Reclamation Plan**

The State of Utah Department of Natural Resources, Division of Oil, Gas and Mining (DOGM) has granted Kennecott a permit to commence a Large Mining Operation (No. M/035/015). Approval was granted January 24, 1996. The permit sets forth in a Reclamation Plan the activities that Kennecott will implement and conditions that will be met for reclamation of the existing impoundment, reclamation of the expanded impoundment during construction, reclamation of areas outside the actual tailings disposal area disturbed during construction, reclamation of impoundment exterior side slopes concurrent with tailings management operations, reclamation following North Impoundment closure and post closure monitoring.

Failure of the Permittee to implement the reclamation plan as set forth in the DOGM permit may result in the modification, suspension or revocation of the Corps' permit. Reclamation and revegetation of the existing impoundment and the north expansion tailings embankment will be done concurrently with construction. The Permittee shall submit a status of compliance report regarding on-going and scheduled reclamation activities with its annual report to the Corps of Engineers, Utah Regulatory Section.

10 **Visual Buffer Zone**

The preliminary design proposed by Kennecott calls for the construction of approximately 50 small hills or hummocks, consisting of several feet of fill and 18 inches of salvaged soil to serve as a planting medium for trees, shrubs and grasses. The final number,location, placement and size of the hummocks will be coordinated with the Utah Regulatory Office so that impacts to wetlands can be minimized. Within 30 days after the issuance of this permit, the Permittee shall submit the final landscape plans, specifications, plant materials list, and construction schedule to the Corps for review and approval. For those hummocks authorized by the Corps, the Permittee agrees to maintain the visual buffer, including the plant material, during the period of impoundment operation.

11 **Land Use**

11-1 The former Morton Salt landfill, characterized as containing waste salt, packaging materials and construction and building debris will be moved to the interior of the tailings impoundment during embankment foundation preparation.

11-2 The Utah Department of Transportation (UDOT) and the Permittee plan to close State Road 202 for approximately two years to allow for the replacement and upgrade of the SR 202 bridge, road pavement and construction of a new railroad crossing. In order to minimize impacts associated with the construction, which would temporarily affect secondary access to Great Salt Lake State Park and Saltair Resort, the Permittee shall prepare and submit to the Corps a construction traffic control plan. The plan should include construction schedule safety procedures, signage and provisions for access to I-80 during construction. It will include a description of how the permittee intends to notify the Department of Natural Resources, Division of Parks and Recreation and Saltair Resort. In addition, the Corps will be notified of any wetlands that may be temporarily affected by the need to detour traffic, provide for staging of equipment and materials, etc. If such is the case, the Permittee will provide information on the amount of fill, area of wetlands affected, duration of the fill and a removal and restoration plan.

11-3 In order to minimize impacts from the relocation of the railroad and powerlines, a single service road incorporated into the railroad right-of-way will be provided. There will be no separate service road for the relocated powerlines.

11-4 This permit authorizes the placement of temporary fill to facilitate the relocation of the powerlines. This may include fill for access, staging and construction. The Permittee will submit a plan showing the location and amount of such temporary fills. The plan will include a schedule for removal of the fill to the original grade and restoration of the site. Where necessary, power poles may be incorporated into the landscaped berms to provide a safe working area. A final plan showing the powerline relocation will be submitted to the Corps prior to the start of said relocation.

11-5 The slag haul road is the primary route for hauling and placing materials for the first stage of construction of the drainage blanket. Because the use of the road is temporary, the Permittee shall submit a plan depicting the location of the haul road, duration of use, a schedule for removal, disposal site(s) and restoration of the affected area.

12 <u>Hazardous Substances</u>

12-1 A fuel, oil and lubricant station is planned to support the mobile equipment to construct and operate the tailings

impoundment.

All petroleum products, chemical or other deleterious material stored at sites where spills could enter waters will be protected by berms or similar structures capable of containing 110% of the capacity of the largest container. The Permittee will submit to the Corps a spill prevention, control and clean-up plan 30 days prior to activation of the facility.

13 Cultural/Historic Resources

The tailings impoundment expansion will affect three historic properties eligible for inclusion in the National Register of Historic Places (NRHP) as described in the report Cultural and Paleontological Inventory of 5490 acres in Western Salt Lake County, Cultural Resources Report 498-01-9211, PIII Associates, 1994.

The three (3) historic properties are: the realigned Western Pacific Railroad, the realigned Union Pacific Railroad and the Salt Lake, Garfield and Western Railroad.

The Corps is responsible for ensuring compliance with Section 106 of the National Historic Preservation Act (NHPA).

In order to mitigate the impact of the Project on the three eligible historic properties, Kennecott (the Permittee) will conduct data recovery activities as stipulated in the Memorandum of Agreement (MOA) between the Corps Utah State Historic Preservation Officer (SHPO) Kennecott and the Advisory Council on Historic Preservation (ACHP). See Attachment 2.

The Permittee will conduct data recovery as described in the Data Recovery Treatment Plan which was approved by the SHPO on November 13, 1995. The Data Recovery Plan (see Attachment 2) requires Archival Research and Analysis, Field Documentation and Data Analysis and Report Preparation. The data recovery report and curation of all materials and records resulting from data recovery will be done in accordance with 36 CFR Part 79. The Permittee will submit the data recovery report to the Corps and SHPO for review and approval. Upon written approval of the data recovery report, the Permittee may proceed with construction which will impact the historic properties.

14 Air Quality

14-1 The State of Utah, Department of Environmental Quality, Division of Air Quality has granted Kennecott an Approval Order (DAQE-627-95). The Approval Order was granted July 14, 1995.

The Approval Order applies to control and mitigation of air emissions related to construction and operation of the Project. The Permittee (Kennecott) shall submit a summary of status of compliance with the UDEQ Approval Order in its annual status report to the Corps.

14-2 In order to reduce fugitive dust emissions (PM_{-10}) and maintain PM_{10} under the State Implementation Plan limits of 100 tons per year during the construction period (1995-1998), the Permittee shall, prior to the start of construction of the drainage blanket for the tailings embankment, pave the slag haul road. It is understood that this road will be used as the primary route for hauling and placing materials for the first stage of construction of the drainage blanket for the new impoundment.

General Conditions

G-1 In order to ensure that all permit conditions are implemented, an annual report shall be prepared by the Permittee, submitted to the Corps of Engineers Utah Regulatory Office, and due on the anniversary of the permit issuance for review and approval. The report shall present a detailed discussion of the status of compliance with each of the permit conditions.

G-2 In order to ensure that all special conditions and appropriate mitigation measures have been incorporated into construction specifications and mitigation plans prior to the start of construction, Kennecott will provide to the Corps written verification that these measures have been incorporated into construction specifications and its contractors have agreed to abide by them.

G-3 The Permittee shall allow authorized Corps representatives upon presentation of credentials to:

a) inspect at reasonable times, facilities or activities, including monitoring and control equipment and practices required under this permit as well assuring permit compliance.

G-4 The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation and is grounds for permit modification, suspension or revocation, The Permittee shall give advance notice to the Corps of any planned changes in the permitted activity which may result in noncompliance of permit requirement.

PERMIT DECISION

I am issuing Permit No. 199450301 for the Kennecott Utah Copper Tailings Modernization Project, North Expansion West alternative and its attendant features as described in the FEIS and subject to the conditions outlined above. The Project is not contrary to the public interest and complies with EPA's Section 404(b)(1) Guidelines subject to the conditions outlined above.

_____
Date

_____
Art Champ, Chief
Regulatory Branch

SUMMARY OF 404 (B)(1) EVALUATION AND CONCLUSION

The 404(b)(1) Guidelines (40 CFR 230) are the substantive criteria used in evaluating discharges of dredged or fill material in waters of the United States under Section 404 of the Clean Water Act, and are applicable to all 404 permit decisions. Subpart B of the Guidelines outlines restrictions imposed on all discharges, the factual determinations required by the Guidelines and specifications for a determination of compliance or non-compliance with the Guidelines.

Section 230.10(a) states no discharge of dredged or fill material shall be permitted, except as provided under Section 404(b)(2) of the Clean Water Act, if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.

Section 203.10(b) establishes three conditions, applicable to inland waters, which must be satisfied to make a finding that a proposed discharge complies with the Guidelines. No discharge of dredged or fill material shall be permitted if it:

a) Violates applicable state water quality standards;

b) Violates any applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act; or

c) Jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or results in likelihood of the destruction or adverse modification of a habitat which is determined to be a critical habitat.

Section 230.10(c) provides that no discharge of dredged or fill material shall be permitted if it will cause or contribute to significant degradation of the waters of the United States, except as provided under Section 404(b)(2).

Section 230.10(d) prohibits the discharge of dredged or fill material, except as provided under Section 404(b)(2) of the Clean Water Act, unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Section 230.11 requires the permitting authority to determine in writing the potential short-term or long-term effect of a proposed discharge of dredged or fill material on the physical, chemical, and biological components of the aquatic environment in light of subparts C-F. The determinations of effects of each proposed discharge shall include the following:

a) Physical substrate determinations;

b) Water circulation, fluctuation, and salinity determinations;
c) Suspended particulate/turbidity determinations;
d) Contaminant determinations;
e) Aquatic ecosystem and organism determinations;
f) Proposed disposal site determinations;
g) Determination of cumulative effects on the aquatic ecosystem; and
h) Determination of secondary effects on the aquatic ecosystem.

404 (B)(1) CONCLUSION

A comparison of the two action alternatives (North Expansion West and East) and the relative impact of these two alternatives on aquatic resources results in the North Expansion West alternative being the least impacting to jurisdictional waters of the United States.

EVALUATION OF COMPLIANCE WITH 404 b(1) GUIDELINES
40 CFR 230.10

A check in a block denoted by an asterisk indicates that the Project does not comply with the guidelines.

1) Alternatives test:

*		i)	Based on the discussion in Chapter 2.0 of the FEIS, are there available, practicable alternatives having less adverse impact on the aquatic ecosystem and without other significant adverse environmental consequences that do not involve discharges into "waters of the United States" or at other locations within these waters?
_____ Yes	__X__ No		
	*	ii)	Based on Chapter 2.0 of the FEIS, if the Project is in a special aquatic site and is not water-dependent, has the Permittee clearly demonstrated that there are no practicable alternative sites available?
__X__ Yes	_____ No	____ NA	

2) Special restrictions. Will the discharge:

*		i)	violate state water quality standards?
_____ Yes	__X__ No		

* ii) violate toxic effluent standards (under Section 307 of the Act)?

____ Yes _X_ No

* iii) jeopardize endangered or threatened species or their critical habitat?

____ Yes _X_ No

* iv) violate standards set by the Department of Commerce to protect marine sanctuaries?

____ Yes _X_ No

v) Evaluation of the information in Chapter 3 of the FEIS indicates the proposed discharge material meets testing exclusion criteria for the following reason(s).

_X_ N/A

( ) based on the information provided in Chapter 3 of the FEIS the material is not a carrier of contaminants.

( ) the levels of contaminants are substantially similar at the extraction and disposal sites and the discharge is not likely to result in degradation of the disposal site and pollutants will not be transported to less contaminated areas.

( ) acceptable constraints are available and will be implemented to reduce contamination to acceptable levels within the disposal site and prevent contaminants from being transported beyond the boundaries of the disposal site.

3) Other restrictions. Will the discharge contribute to significant degradation of "waters of the United States" through adverse impacts to:

*		i)	human health or welfare, through pollution of municipal water supplies, fish, shellfish, wildlife and special aquatic sites?
_____ Yes	__X__ No		
*		ii)	life states of aquatic life and other wildlife?
_____ Yes	__X__ No		
*		iii)	diversity, productivity and stability of the aquatic ecosystem, such as loss of fish or wildlife habitat, or loss of the capacity of wetlands to assimilate nutrients, purify water or reduce wave energy?
_____ Yes	__X__ No		
*		iv)	recreational, aesthetic and economic values?
_____ Yes	__X__ No		

	*	4)	Actions to minimize potential adverse impacts (mitigation). Will all appropriate and practicable steps (40 CFR 230.70-77) be taken to minimize the potential adverse impacts of the discharge on the aquatic ecosystem?
__X__ Yes	_____ No		

Based upon the 404(b)(1) evaluation, the North Expansion West also complies with Section 230.10 (b), (c) and (d). Appropriate and practical steps to minimize potential adverse impacts have been developed and are discussed in detail in Section 3.13 of the FEIS and in the Wetland Mitigation Plan.